

WHAT IS CLAIMED IS:

1. A semiconductor device, comprising:
2 a channel region located in a semiconductor substrate;
3 a trench located adjacent a side of the channel region;
4 an isolation structure located in the trench; and
5 a source/drain region located over the isolation structure.

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9 2. The semiconductor device as recited in Claim 1 wherein
the trench is a first trench and the semiconductor device further
includes a second trench located on an opposing side of the channel
region, wherein the isolation structure is a first isolation
structure located in the first trench and the semiconductor device
further includes a second isolation structure located in the second
trench, and wherein the source/drain region is a first source/drain
region and the semiconductor device further includes a second
source/drain region located over the second isolation structure.

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2 3. The semiconductor device as recited in Claim 1 wherein
the source/drain region comprises polysilicon.

4. The semiconductor devices as recited in Claim 1 wherein
2 the source/drain region comprises epitaxial silicon.

5. The semiconductor device as recited in Claim 1 wherein a
2 side wall of the trench includes an oxide layer.

6. The semiconductor device as recited in Claim 5 further
2 including a nitrided layer located on the oxide layer.

7. The semiconductor device as recited in Claim 1 wherein
2 the isolation structure comprises an oxide.

8. The semiconductor device as recited in Claim 1 wherein
2 the source/drain region includes a lightly doped source/drain
3 region having a dopant concentration ranging from about 1E16
4 atoms/cm³ to about 1E17 atoms/cm³, and a source/drain contact region
5 having a dopant concentration up to about 1E22 atoms/cm³.

9. A method of manufacturing a semiconductor device,

2 comprising:

3 forming a channel region in a semiconductor substrate;

4 forming a trench adjacent a side of the channel region;

5 forming an isolation structure in the trench; and

6 forming a source/drain region over the isolation structure.

10. The method as recited in Claim 9 wherein forming the

2 trench includes forming a first trench and the method further

3 includes forming a second trench on an opposing side of the channel

4 region, wherein forming the isolation structure includes forming a

5 first isolation structure in the first trench and the method

6 further includes forming a second isolation structure in the second

7 trench, and wherein forming the source/drain region includes

8 forming a first source/drain region and the method further includes

9 forming a second source/drain region over the second isolation

10 structure.

11. The method as recited in Claim 9 wherein forming the

2 source/drain region includes forming a polysilicon source/drain

3 region.

12. The methods as recited in Claim 9 wherein forming the

2 source/drain region includes epitaxially growing the source/drain
3 region from the channel region.

13. The method as recited in Claim 9 further including
2 forming an oxide layer on a side wall of the trench.

14. The method as recited in Claim 13 further including
2 forming a nitrided layer on the oxide layer.

15. The method as recited in Claim 9 wherein forming an
2 isolation structure includes forming an isolation structure
3 comprising an oxide.

16. The method as recited in Claim 9 wherein forming a
2 source/drain region includes forming a lightly doped source/drain
3 region having a dopant concentration ranging from about 1E16
4 atoms/cm³ to about 1E17 atoms/cm³, and forming a source/drain
5 contact region having a dopant concentration up to about 1E22
6 atoms/cm³.

17. An integrated circuit, comprising:

2 semiconductor devices, including;

3 a channel region located in a semiconductor substrate;

4 a trench located adjacent a side of the channel region;

5 an isolation structure located in the trench; and

6 a source/drain region located over the isolation

7 structure; and

8 dielectric layers located over the semiconductor devices and

9 having interconnect structures located therein that electrically

10 connect the semiconductor devices to form an operative-integrated

11 circuit.

18. The integrated circuit as recited in Claim 17 wherein the

2 trench is a first trench and the semiconductor device further

3 includes a second trench located on an opposing side of the channel

4 region, wherein the isolation structure is a first isolation

5 structure located in the first trench and the semiconductor device

6 further includes a second isolation structure located in the second

7 trench, and wherein the source/drain region is a first source/drain

8 region and the semiconductor device further includes a second

9 source/drain region located over the second isolation structure.

19. The integrated circuit as recited in Claim 17 wherein the

2 isolation structure comprises an oxide.

20. The integrated circuit as recited in Claim 17 wherein the
2 semiconductor devices form part of an N-type metal oxide
3 semiconductor (NMOS) device, a P-type metal oxide semiconductor
4 (PMOS) device, a complementary metal oxide semiconductor (CMOS)
5 device, a bipolar device, or a memory device.